

# **Mapping and Planetary Spatial Infrastructure Team**

*Report to the Planetary Science Subcommittee  
March 2016*

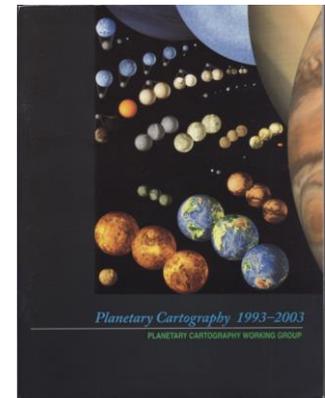
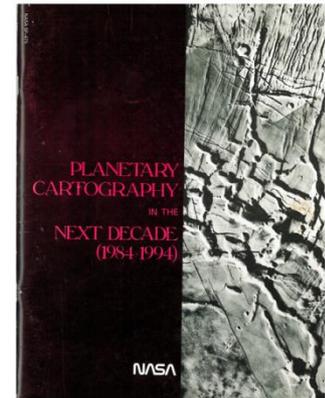


# *Introducing the Mapping and Planetary Spatial Infrastructure Team*

- **Mosaics, geologic maps, derived regional and global data products, and associated geospatial infrastructure are integral to the success of the planetary science enterprise**
  - **Influences all phases of the mission lifecycle for science investigations and operations**
  - Strategic needs must be anticipated and prioritized by the community
  - PSS recommended a “Cartography Research and Analysis Group” [CRAG] in Fall 2014.
- A team fulfilling this role now exists in the form of MAPSIT
  - MAPSIT succeeds former PCGMWG and assumes strategic planning role

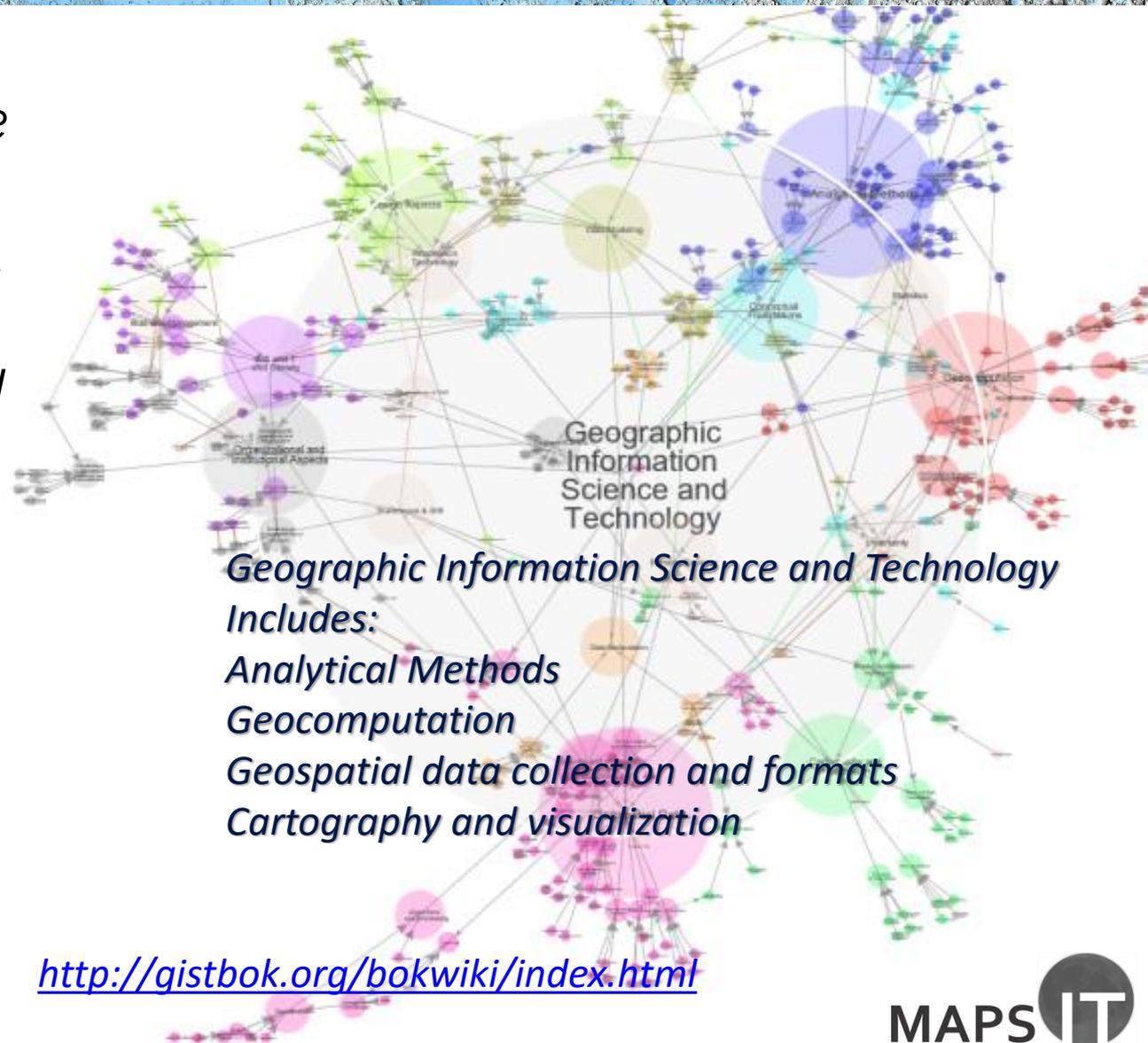
# But wait, I thought we did this already?

- **No, we didn't (really!)**
- From 1974 to 2012:
  - 1974: Lunar Photography and Cartography Committee (LPACC)
  - 1977: Lunar and Planetary Photography and Cartography Committee (LPPACC)
  - 1979: Planetary Cartography Working Group (PCWG)
    - Produced two 10-year plans and a supplement (at right)
  - 1994-2012: Planetary Cartography & Geologic Mapping Working Group (PCGMWG)
    - PCGMWG ceased “advisory” role in ~2011
    - PCGMWG disbanded 2015 with end of PGG
- **Looming gap for NASA long-term strategic planning and prioritization activities until addressed by MAPSIT formation**



# Enabling Planetary Science

- Planetary Spatial Infrastructure is the technology, policies, standards, human resources, software tools, and related activities necessary to acquire, process, distribute, use, maintain, and preserve planetary spatial data for science and exploration



**Geographic Information Science and Technology Includes:**

**Analytical Methods**

**Geocomputation**

**Geospatial data collection and formats**

**Cartography and visualization**

<http://gistbok.org/bokwiki/index.html>

# MAPSIT Steering Committee

- Samuel Lawrence, Arizona State University [Chair]
- Jani Radebaugh, Brigham Young University [Incoming Chair]
- Shane Byrne, University of Arizona
- Sarah Sutton, University of Arizona
- Daniella DellaGiustina, University of Arizona
- Brad Thomson, Boston University
- Erwan Mazarico, NASA Goddard Space Flight Center
- David Williams, Arizona State University
- James Skinner, United States Geological Survey
- Trent Hare, United States Geological Survey
- Brent Archinal, United States Geological Survey
- Robin Fergason, United States Geological Survey
- Justin Hagerty, United States Geological Survey
- Lisa Gaddis, United States Geological Survey
- Jay Laura, United States Geological Survey

## *REPRESENTING A DIVERSE COMMUNITY:*

- *DOMAIN GEOSCIENCE SPECIALISTS*
  - *MOON, MERCURY, SMALL BODIES, OUTER PLANETS, MARS...*
- *PHOTOGRAMMETRY AND GEODESY*
  - *SOCET-SET, SOCET-GXP*
- *GEOLOGIC MAPPERS*
- *MISSION PARTICIPATION*
  - *LRO, MRO, OSIRIS-REX, MESSENGER, CASSINI, GALILEO*
- *CARTOGRAPHIC SOFTWARE EXPERTISE*
  - *E.G. ISIS, ARCMAP, QGIS, LUNASERV*
- *HUMAN EXPLORATION*
  - *SKG AND ISRU EXPERTISE*

## *Geologic Mapping Subpanel*

David Williams [ASU] (Chair)

David Crown [PSI]

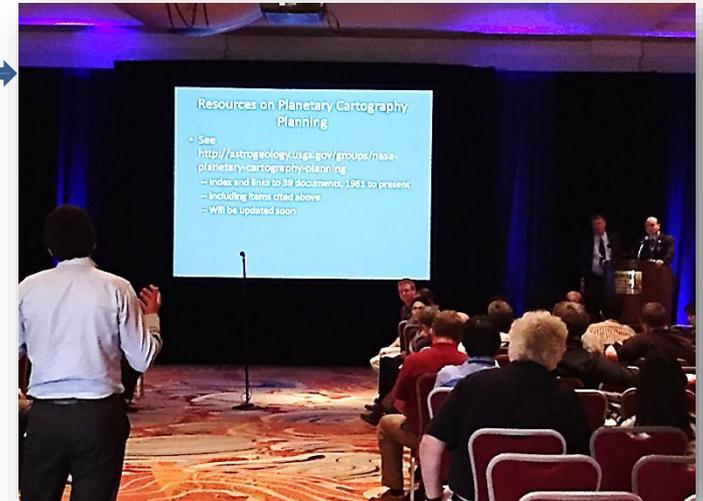
Debra Buczkowski [JHU-APL]

Corey Fortezzo [USGS]

James Skinner [USGS]

# MAPSIT Activities 2015

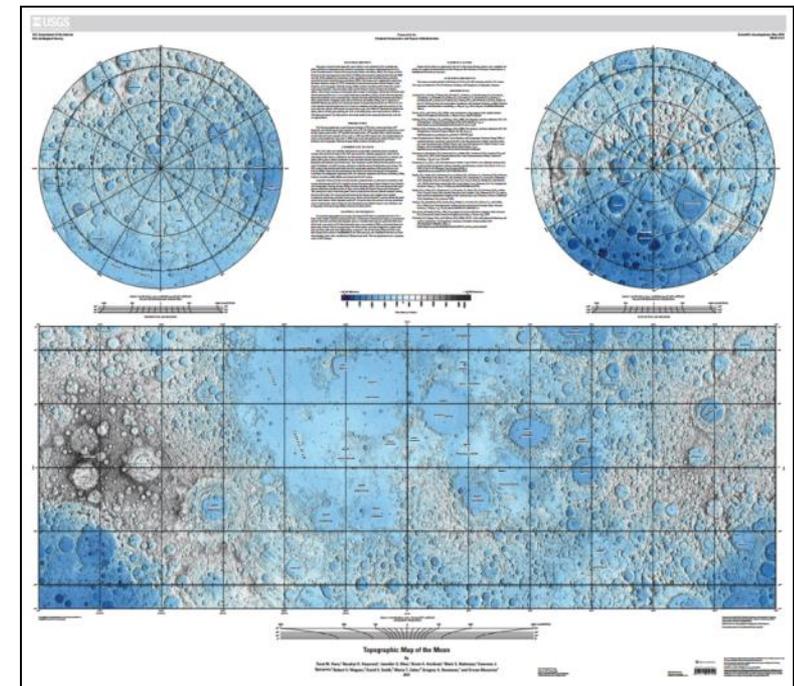
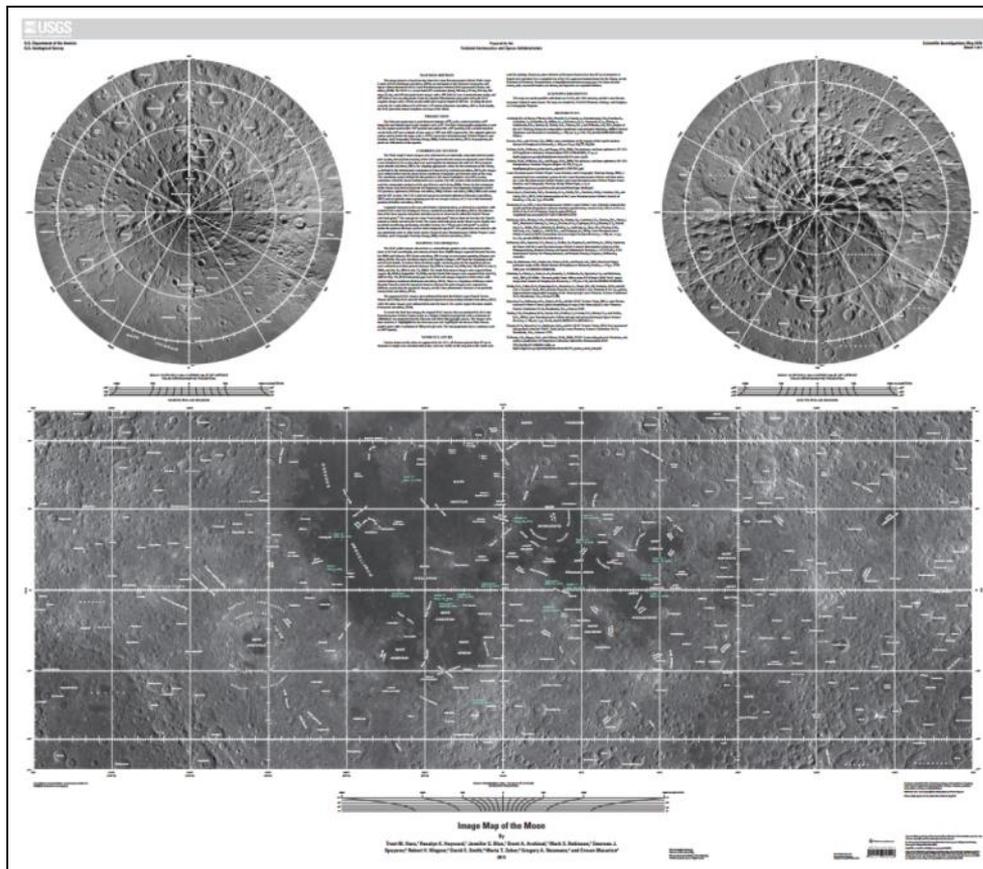
- Town Hall at LPSC 46
- 2<sup>nd</sup> Data User's Workshop
  - High Country Conference Center, Flagstaff, AZ
  - June 6-7 2015
  - 115 attendees
- Steering Committee Meeting October 2015
  - Shoemaker Center, Flagstaff, AZ
- Community response to PDS RFI



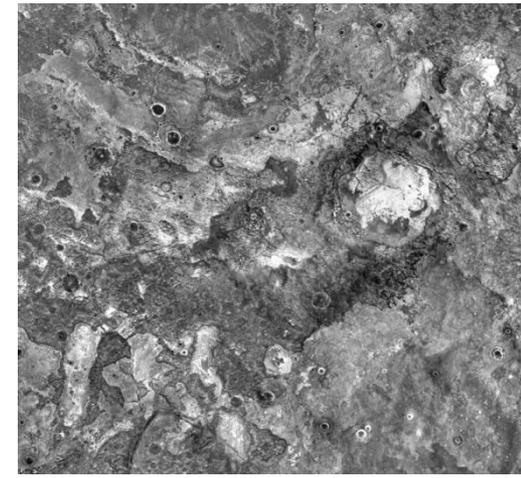
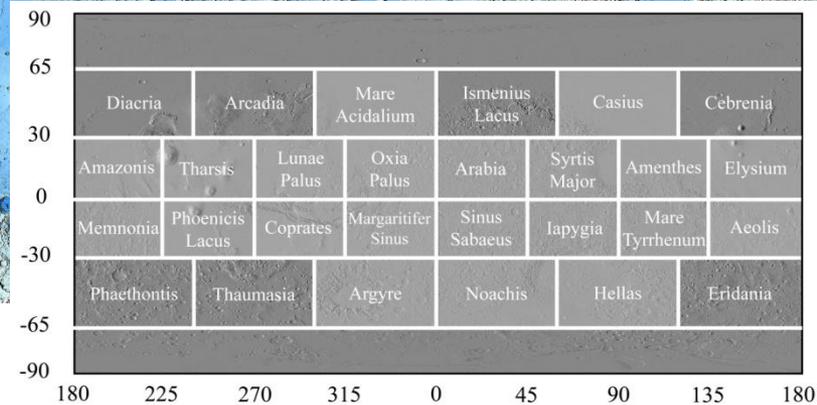
# Community Update

## Image Mosaic and Topographic Map of the Moon (Outreach Maps)

- 7.2 million PDF total downloads for 2015 (April release)
  - Tweet Release (Apr.): 2.4 million, USGS Press Release (Oct.): 3.3 million
- 3,000 printed hard-copies (ordered another 2,000 for second printing)



# Community Update



- USGS is assembling and geodetically controlling THEMIS daytime IR and nighttime IR images
  - 21 regions are completed
  - Knowledge of the precision and accuracy of the products are reported
- Improved kernels allow scientists to perform quantitative analyses with THEMIS using their existing tools.
- Invaluable for mission planning and surface science
  - E.g., change detection studies and for comparison with previous, concurrent, and future images; improved targeting of current and future orbital acquisition of data, and spacecraft landings.

<http://astrogeology.usgs.gov/maps/mars-themis-controlled-mosaics-and-preliminary-smithed-kernels>

# Planetary Geologic Mapping

- Status:
  - >170 geologic maps completed, printed, and distributed by USGS on behalf of NASA
    - Multiple bodies, bases, and scales
    - Additional ~60 in process, review, or production
- Updates:
  - Working with RPIF to identify and distribute excess geologic maps (community, educators, public)
  - Mappers now required (via ROSES) to identify geologic map specifications
  - Community input/concerns via annual meeting, consolidated via GEMS to MAPSIT
- Noteworthy:
  - Increase in attendance at the annual meeting
  - Seeing various scales, various bodies of geologic maps
  - Interest from missions on means to conduct mapping along mission timeline
  - Drawing attention to “standardized” versus “topical” mapping
  - Efforts to engage and develop “next generation” of mappers

# MAPSIT 2016 Activities

- Town Hall at LPSC 47
  - (Thursday, Noon, Waterway 6)
- Planetary Geospatial Session at LPSC
  - Oral Session (Weds. Afternoon Waterway 4), Poster Session Thursday
- MAPSIT Forum at 2016 Geologic Mappers Meeting, Flagstaff, AZ
- Synthesize 2017-2022 Planetary Geospatial Strategic Plan [PGSP]
  - PGSP Foundations Document under review
  - Comprehensive PGSP Community Stakeholder Input Process Begins 1Q2016
  - Nominal PGSP Delivery by end CY2016
  - Critical community stakeholder input for the Cartography Program under terms of new USGS-NASA Interagency Agreement
  - **Goal is a concise document to inform decision-making**
- Begin planning for Planetary Data User's Workshop 3, 2017
- Contribute to ISCEG Strategic Knowledge Gaps as needed
  - Moon, Small Bodies, Mars
    - *Example from LEAG GAP-SAT II: "Combine Kaguya, ULCN2005, LRO LOLA, and LRO WAC GLD100 topographic products to produce a definitive lunar geodetic to facilitate future exploration planning. This enhances current capabilities." – pg. 24*

# *On the Horizon...*

- Need to control, reduce, and release ever-increasing datasets to make the data most useful and convenient for Exploration and science analysis
  - What are mission requirements for data calibration and cartographic processing?
  - How is planetary spatial infrastructure to be prioritized in R & A programs?
    - How do we deal with planetary spatial data product generation that enables community science investigations being assessed against pure science assessed against force-multiplying software development?
- What cartographic products and software tools are needed to close Strategic Knowledge Gaps?
- How should standards be coordinated internationally?
- How do we facilitate co-registration of US and international datasets?